

I claim:

1. An active electronic device comprising a conductive composite having at least two electrodes attached thereto wherein the composite comprises a combination of conductive nanostructures and a second material surrounding said nanostructures.
2. The active electronic device of claim 1 wherein the nanostructure is present as a random network of nanostructures, aligned or partially aligned individual nanostructures or bundles of individual nanostructures or as a mat of nanostructures.
3. The active electronic device of claim 2 where the nonconducting, poorly conducting or semiconducting coating material comprises a coating on all sides of the nanostructure, or on all nanostructures in a bundle or a mat of nanostructures.
4. The active electronic device of claim 3 comprising diodes, field effect transistors, optoelectronic devices or devices which function as a result of a charge transfer between the two elements of the composite.
5. The active electronic device of claim 4 wherein the conductive nanostructures comprise nanowires, nanofibres, nanoribbons, nanoplates or nanotubes.
6. The active electronic device of claim 5 wherein said device is a field effect transistor comprising a composite including carbon nanostructures in a nonconducting, poorly conducting or semiconducting coating material, said composite located on a first surface of a nonconducting substrate, said substrate having a source electrode and a drain electrode attached to said first surface, each electrode being in contact with the composite, and a gate electrode applied to the substrate structure.
7. The active electronic device of claim 6 wherein the nonconducting substrate is an inorganic dielectric or a non-conducting polymer
8. The active electronic device of claim 6 where the nonconducting, poorly conducting or semiconducting coating material is a polymer, organic compound, or inorganic material.
9. The active electronic device of claim 5 wherein said device is a diode comprising a first and a second composite, each of the first and second composite including nanostructures in a nonconducting, poorly conducting or semiconducting coating material, the first composite having p-type characteristics and the second composite having n-type characteristics, said composite located on a first surface of a nonconducting substrate, said substrate having a first electrode and a second electrode attached to said first surface, the first electrode being in contact with the first

composite and the second electrode being in contact with the second composite, the first electrode and the second electrode functioning as source and drain electrodes.

10. The active electronic device of claim 9 wherein the nonconducting substrate is an inorganic dielectric or a non-conducting polymer

11. The active electronic device of claim 9 where the nonconducting, poorly conducting or semiconducting coating material is a polymer, organic compound, or inorganic material.

12. The active electronic device of claim 5 wherein said device is a optoelectronic device comprising a composite, said composite including carbon nanostructures in a light activated coating material, said composite located on a first surface of a nonconducting substrate, said composite having a first electrode and a second electrode attached thereto in a spaced apart manner, the first electrode and the second electrode functioning as source and drain electrodes, said electrodes also attached to an electronic circuit.

13. The active electronic device of claim 12 wherein the nonconducting substrate is a transparent glass or a transparent polymeric material.

14. The active electronic device of claim 12 where the light activated coating material is a non-conductive or semi-conductor polymer, organic compound, or inorganic material.

15. The active electronic device of claim 11 wherein the polymer is poly{(m-phenylenevinylene)-co-[(2,5-diethyloxy-p-phenylene)vinylene]} or regioregular poly(3-octylthiophene-2,5-diyl).

16. The active electronic device of claim 12 wherein the polymer includes light activated substituents or conducting polymers blended therein.

17. The active electronic device of claim 16 wherein the polymer includes rhodopsin or porphyrine.

18. The active electronic device of claim 16 wherein the polymer includes a conducting second polymer blended therein.

19. The active electronic device of claim 16 wherein the polymer includes polyaniline blended therein.

20. The active electronic device of claim 1 comprising active matrix flexible displays, solar cells, light, sensors or radio frequency ID tags.

21. The active electronic device of claim 5 where the nonconducting, poorly conducting or semiconducting coating material is an active material such that exposure to light, pressure or heat causes the rearrangement of electrons within the composite.